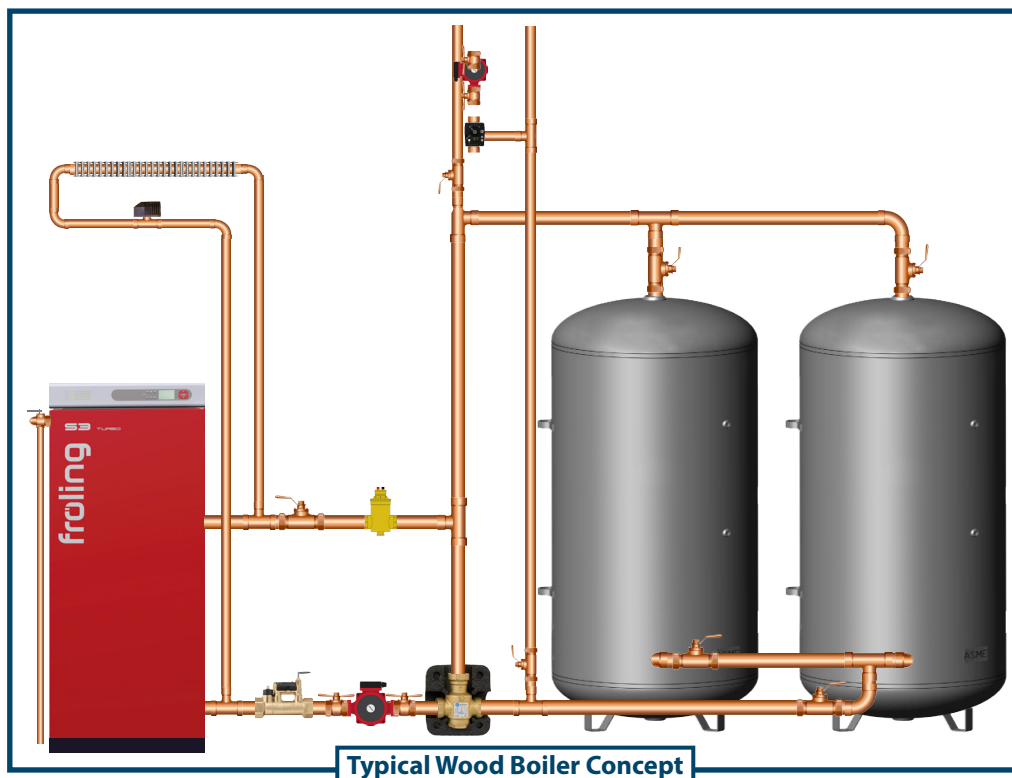




Heat Storage Systems

- Optimize Efficiency
- Reduce Service
- Simplify Operation
- Extend Boiler Life



How Heat Storage Works:

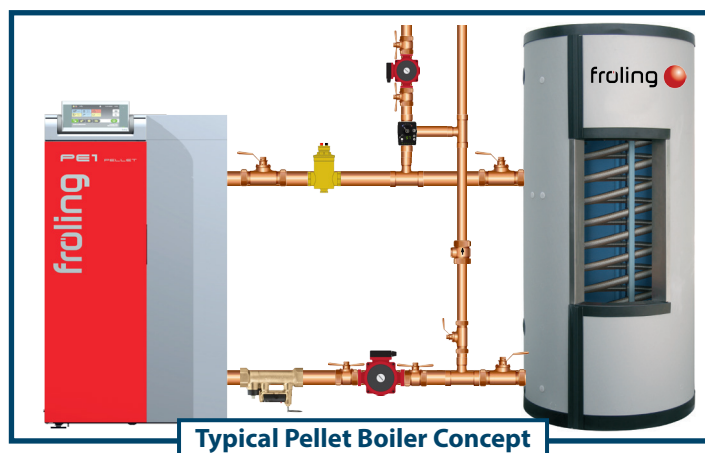
Heat storage is an important component of modern wood boiler systems. By absorbing extra heat generated during the burn cycle, heat storage allows wood boilers to operate with less tending, lower emissions and higher efficiency. Heavy tank insulation holds stored heat, allowing for 24 hours or more between burn cycles. Wood boilers used properly with heat storage will form no harmful firebox condensate and will outlast boilers used without thermal storage. Heat storage is a condition of some wood boiler warranties and EPA approvals.

Using properly sized heat storage with wood pellet and wood chip boilers can reduce on/off cycling by half or more. Reducing cycling dramatically decreases emissions and the need for boiler service, while improving heating response time. This means less ash creation and a higher degree of building occupant comfort.

While not all boilers sold by Tarm Biomass require thermal storage, we almost always recommend it.

Tarm Biomass is Your Heat Storage Systems Expert

Tarm Biomass has been providing heat storage systems for 20 years. For us, heat storage is not an after-thought. We consider heat storage an essential component of biomass boiler installations. Our experience enables us to help design and provide thermal storage systems that are not only functional, but durable.





Pressurized Thermal Storage Tanks



Tarm Biomass pressurized thermal storage tanks are USA made from thick carbon steel and are ASME certified. They are insurable, safe, and designed to be maintenance-free and long-lasting. Tanks under system pressure are oxygen-free, which means the steel will not corrode when properly installed. The vertically designed tanks save valuable floor space while encouraging desirable thermal stratification. The tanks are insulated after placement for ease of movement and installation. Tarm Biomass has a wealth of expertise in the application of thermal storage and we provide conceptually designed piping diagrams. Standard diameters are 30 inches for 220-gallon tanks and 36 inches for 300 and 400-gallon tanks. 220 and 300-gallon tanks require eight foot high ceilings and 400-gallon tanks need nine foot high ceilings. Tarm Biomass stocks most valves and controls for easy integration of thermal storage with your wood or wood pellet boiler. Visit the resources tab at www.woodboilers.com to learn more about system integration.

- 220, 300, and 400 gallon tanks standard; custom sizes available.
- Maximum design pressure 125 psi.
- Maximum operating temperature 450 °F far surpasses plastic and rubber alternatives.
- Low head loss design.
- Closed system does not require annual water level and Ph testing.
- Heavy-duty commercial quality tanks.
- Use with Fröling Energy Tank for excellent domestic hot water production.
- One-year warranty.

Fröling Energy Tank



The Fröling Energy Tank is a unique stratification tank ideal for use as a heat storage/buffer tank for small pellet boilers and/or as a high performance hot water heater in other applications. The Energy Tank is now available with or without a domestic hot water coil. The 104' long (64 square feet of heat exchange surface) stainless steel coil enhances a modestly sized, super insulated heat storage tank with exceptional water heating capability. The coil consistently produces domestic hot water even with low input temperatures. Large tapings further increase potential applications for the Energy Tank.

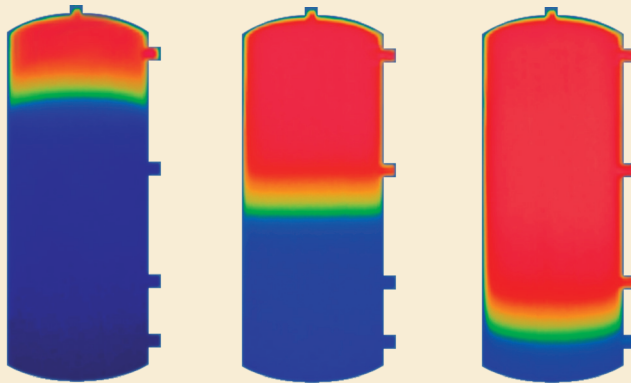
The Fröling Energy Tank is perfect for pellet boilers with 25 kW or less output. Pellet boilers modulate to match heating demand, but when thermostats are satisfied, it will take only a few minutes before a fully modulated pellet boiler will have to shut off. The Energy Tank solves that problem by absorbing surplus heat and releasing it again to the heat distribution system as required, which often eliminates on/off cycling. Wear and emissions are significantly decreased.

- One size; 119 gallon carbon steel tank.
- Stratification baffle enhances effectiveness of stored heat
- Zip on/off insulation results in losses of less than 1/3 degree Fahrenheit/hr.
- Corrugated stainless steel coil creates 64 square feet of heating surface.
- Strategically sized and located tapings for use as a thermal buffer or domestic hot water tank.
- Sensor bar holds many sensors at various positions.
- Perfect for Fröling pellet boilers up to 25Kw.
- 5 year warranty.



Energy Tank With and Without Stratification Baffle

With Stratification Baffle



Actual thermal imaging demonstrates the effectiveness of the stratification baffle. Temperature is strictly separated between hot and cold allowing the boiler to remain off for longer periods. Heat output remains at maximum until energy is completely depleted.

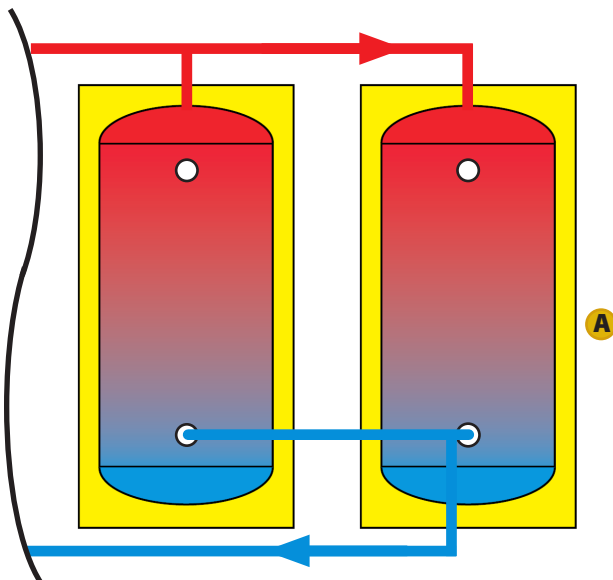
Without Stratification Baffle (for illustration purposes only)



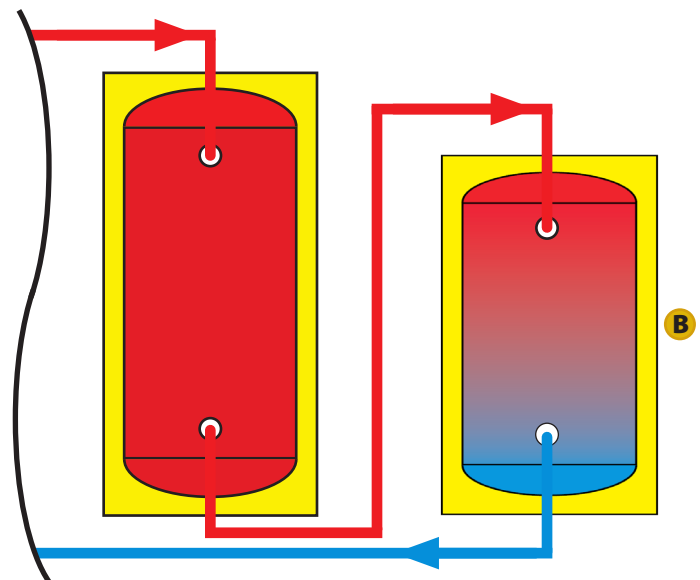
Diluted temperatures decrease the energy storage capacity of the tank.

Thermal Storage Tank Piping

There are a wide variety of piping options when using one or more thermal storage tanks. If a larger buffer tank is required, one to four tanks can be connected together either in parallel reverse return (preferred method) or in series. The parallel reverse return system **(A)** (also called Tichelmann System) guarantees equal charging and utilization of energy in the thermal storage tanks. Having the same pipe lengths for both supply and return will prevent any balancing issues. When the tanks are physically different in size or are not in the same location, series connection is an option **(B)**. The first tank will charge before charging the next tank. Reverse flow removes energy from the tanks. Tarm Biomass has many plumbing drawings available - please see our planning guides.



Parallel Reverse Return Example



Series Connection Example



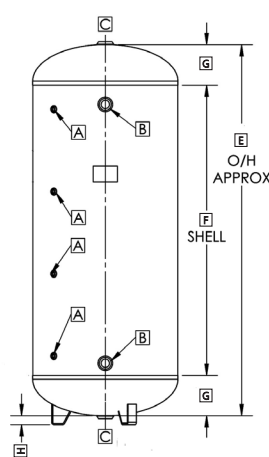
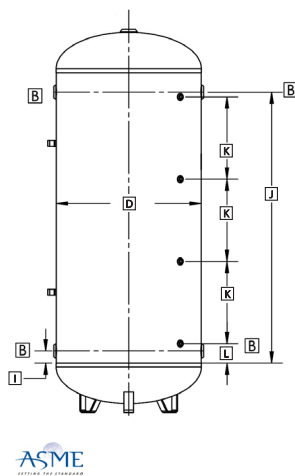
Recommended Tank Sizing

Tank Sizing*		
Boiler Model	Boiler Output	Volume (Minimum - Ideal)
Fröling S3 Turbo 30 Wood Boiler	95,539 Btu/hr	400-800 Gallons
Fröling S3 Turbo 50 Wood Boiler	163,783 Btu/hr	600-1200 Gallons
Effecta Smart 40 Wood Boiler	136,500 Btu/hr	400-900 Gallons
Effecta Smart 55 Wood Boiler	188,000 Btu/hr	800-1200 Gallons
Fröling PE1 20 Pellet Boiler	68,243 Btu/hr	119-185 Gallons
Fröling PE1 35 Pellet Boiler	119,425 Btu/hr	200-325 Gallons
Fröling P4 48 Pellet Boiler	163,780 Btu/hr	300-450 Gallons
Fröling P4 60 Pellet Boiler	200,000 Btu/hr	400-560 Gallons
Fröling P4 80 Pellet Boiler	273,000 Btu/hr	600-740 Gallons
Fröling P4 100 Pellet Boiler	341,000 Btu/hr	600-925 Gallons

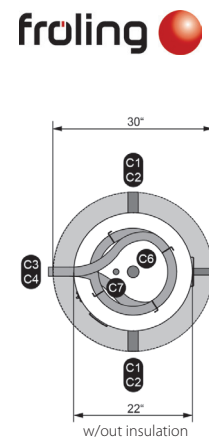
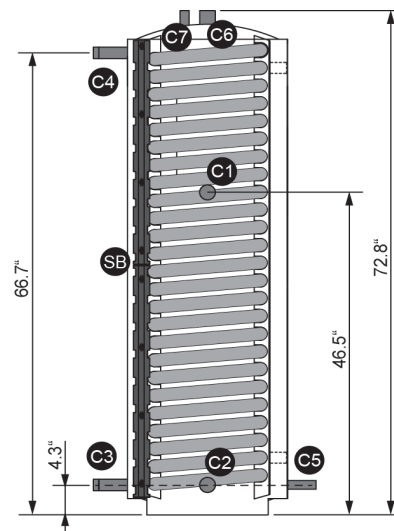
*Unique conditions may impact thermal storage recommendations. Please contact Tarm Biomass for sizing advice.

Tank Specifications*

Tarm Biomass Pressurized Thermal Storage



Fröling Energy Tank



Tank Description	Tank Capacity	Total Capacity	C1	C2	C3**	C4**	C5	C6	C7	Weight
Units	gals	gals	inches	inches	inches	inches	inches	inches	inches	lbs
Energy Tank FT119Coil	108	119	1½	1½	1¼	1¼	¾	1½	¾	260
Energy Tank ET119NoCoil	119	119	1½	1½	-	-	¾	1½	¾	216

Tank Description	A	B	C	D	E	F	G	H	I	J	K	L	Weight
Units	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	lbs
Tarm Biomass 220 Gallon	½	1½	2	30	76¾	60	8¾	1⅞	2 ½	56	17	4	345
Tarm Biomass 300 Gallon	½	1½	2	36	71½	50	10¾	1¾	2 ½	46	14	4	465
Tarm Biomass 400 Gallon	½	1½	2	36	93½	72	10¾	1¾	2 ½	68	21	4	600

*Specifications are subject to change **Connections only on the FT119 Coil Tank

June 2019